

REMARKS

Claims 1-29, 31-46 and 48-59 are currently pending in the present application. Favorable consideration and allowance of these claims are respectfully requested.

The Examiner is thanked for his careful consideration of this case and the withdrawal of the rejections under 35 U.S.C. § 112 is acknowledged with appreciation.

Claims 1 and 2 are amended to recite that the component substrate is based on a nickel or titanium alloy and that the substrate surface region is at the component surface. The nickel or titanium alloy is supported in the specification at least, for instance, in paragraph [0019] on page 7 of the specification. The substrate surface region being at the component surface is supported, for instance, in paragraph [0009].

The rejection of claims 1-17 under 35 U.S.C. § 102(b) over Murphy (5,716,720) is respectfully traversed.

Independent claims 1 and 2 recite a component with a platinum-aluminum substrate surface region and the aluminum content in the substrate surface region is less than 18 wt %. These claims clarify that the substrate surface region is **“at the component surface.”** Independent claim 11 recites that the **“integrated aluminum content in a surface layer** is less than 18 wt%”. As a result, any reference which fails to teach (1) a surface region **“at the component surface”** with an aluminum content less than 18 wt % (for claims 1 and 2 and the claims dependent therefrom) or (2) a **surface layer** with an integrated aluminum content less than 18 wt % (for claim 11 and the claims dependent therefrom) does not meet the limitations of these claims. By definition, the relevant layer is at the surface of the component.

On page 18, the recent Office Action indicates that an “inner diffusion zone must have aluminum content less than the value in the intermediate layer.” This is irrelevant to the present claims, because the relevant claim limitations

address the aluminum content **at the component surface** and **not** in an interior layer. The claimed layer, which is **at the component substrate surface** or **in a surface layer** is different from a layer which is underneath other layers.

Murphy does not teach a substrate surface region which is at the component surface and also meets the limitations of independent claims 1, 2 or 11. Instead, Murphy provides an intermediate layer having an aluminum concentration of from about 18 to about 26 % by weight and this intermediate layer is then covered by two further protective layers. Because the only layers in Murphy that meet the “aluminum content less than 18 wt %” limitation are interior layers, they are not surface layers. As a result, Murphy’s disclosure of a thermal barrier protected component fails to anticipate a component with a platinum-aluminum substrate surface region as set forth in independent claims 1, 2 and 11.

Murphy recites a thermal barrier coating system with an intermediate phase bond coat, *see, e.g.* the title. In particular, in the “Description of the Invention” Murphy describes a substrate as having “a multi-layered structure comprising a first bond coat layer...a thermally grown alumina layer on the bond coat, and a ceramic thermal barrier layer...on the thermally grown alumina layer.” *See*, col. 3, lines 25 – 33. At col. 3, lines 50 – 59 Murphy indicates that the bond coat layer comprises a chemical vapor deposited, platinum modified diffusion aluminide layer. This diffusion aluminide layer includes an inner diffusion zone and an outer layer region. The outer layer region includes a platinum modified intermediate phase of aluminum and nickel. Col. 4, lines 6–17 clarify that it is this intermediate layer which has an average aluminum concentration of about 18 to about 26 % by weight. As described above, on top of this intermediate layer are provided a thermally grown alumina layer and a ceramic thermal barrier layer. Thus, Murphy does not teach a substrate surface region which is at the **component** surface which also meets the limitations of claims 1 and 2. Instead, Murphy provides an intermediate layer having an aluminum concentration of from about 18 to about 26 % by weight and this

intermediate layer is then covered by two further protective layers. As a result, Murphy fails to teach a component with a platinum-aluminum substrate surface region as is set forth in claims 1 and 2.

The Office Action improperly interprets “comprising” to mean that the claimed substrate surface region need not be at the surface. This reading of the claim not only ignores the requirement that the substrate surface region be at the surface, this reading completely contradicts the express language of the claim, which requires that the substrate surface region is at the surface. Such disregard for the elements appearing in a claim is inappropriate and cannot form the basis for a proper rejection. Moreover, claims 1 and 2 are amended to clarify that the substrate surface region is at the component surface. Claim 11 recites that the integrated aluminum content at the surface layer. When further layers are applied over the relevant substrate surface region, the substrate surface region is no longer at the surface and does not meet the limitations of these claims.

Moreover, Murphy’s disclosure of an aluminum concentration of from about 18 to about 26 percent by weight actually teaches away from the claimed aluminum concentration of less than 18 weight percent. A person of skill in the art would not read the disclosure to suggest an aluminum concentration as presently claimed.

The reference fails to teach a substrate region which is at the surface, and that this region has an aluminum concentration of less than 18 weight percent. Further, the claims should not be read in a way that ignores the requirement that substrate surface region is at the component surface.

Because the reference fails to teach each and every element of the claimed invention the rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

The rejection of claims 1-3, 8-12, 16-18 and 22-24 under 35 U.S.C. § 102(b) over Rose et al. (5,482,578; 5,492,796; and 5,843,588) is respectfully traversed.

The Office Action cites Rose '578 as teaching that aluminum is applied in a concentration of from 1 to 15 wt %. This is wrong, as the relevant portion of the reference, col. 3, lines 47 – 50 discuss the aluminum content of the aluminum source powder used in the diffusion process. As stated previously, there are a whole host of factors which have an effect on the aluminum content of the substrate surface region including, for instance, a variety of different diffusion parameters such as the time and temperature of the diffusion process. Accordingly, it does not necessarily follow that starting with an aluminum source powder which is present in an amount between 1 to 15 % by weight will result in an integrated aluminum content in the substrate surface region which is less than 18 % by weight.

None of the Rose patent references recite the actual integrated aluminum content in the substrate surface region as is presently claimed. Instead, the references merely refer to the desirable starting materials. As a result, none of the Rose patents teach the presently claimed invention. Because the references fail to teach each and every element of the claimed invention the anticipation rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

The rejection of claims 1-4, 8-13, 16-19 and 22-24 under 35 U.S.C. § 102(b) over Rickerby et al. (EP 0 718 419) is respectfully traversed.

Like the Murphy reference discussed above, Rickerby relates to a multi-layer coating system where the aluminum containing later is underneath two further layers. In particular, and much like the teachings of the Murphy reference, in Rickerby an oxide layer and an outer ceramic insulating layer are provided on top of the aluminum-containing bond coat. As a result, Rickerby fails to teach a component with the requisite platinum-aluminum substrate surface region which is at the component surface.

Because the references fail to teach each and every element of the claimed invention the anticipation rejection cannot be properly maintained and reconsideration and withdrawal thereof are respectfully requested.

The rejection of claims 1-4, 8-13 and 16-17 under 35 U.S.C. § 102(b) over Sangeeta (6,395,406) is respectfully traversed.

This reference teaches the use of various slurries to form a platinum aluminide coating. In particular, the reference describes the aluminum content of the first slurry and platinum content of a second slurry, *see*, col. 3, lines 38 – 40 and col. 4, lines 33 – 34. The reference does not, however, teach a desired metal content of the resulting coating. As a result, the reference fails to teach a component with a platinum-aluminum substrate surface region wherein the integrated aluminum content in the substrate surface region is less than 18 weight percent, as is presently claimed. As discussed above, the actual aluminum content achieved would vary depending on a number of factors relating to not only the starting materials but also the actual diffusion treatment process itself. As a result, the reference fails to teach each and every element of the claimed invention and the anticipation rejection cannot be properly maintained. Reconsideration and withdrawal thereof are respectfully requested.

The rejection of claims 18-24 and 52-59 and of rejection of claims 25-29, 31-46 and 48-51 under 35 U.S.C. § 103(a) over Murphy (5,716,720) in view of Sangeeta et al. (6,485,780) is respectfully traversed.

The rejected claims relate to methods of manufacturing components where, in claims 18-24, the integrated aluminum content is less than 18 weight percent and in claims 52-59 at least one of the platinum and aluminum content in a zone of the substrate surface region is essentially constant. Claims 25-29, 31-46 relate to components and claims 48-51 relate to coatings with a zone having an essentially constant content of platinum or aluminum.

The Office Action admits that Murphy does not teach diffusion of aluminum subsequent to diffusion of platinum. Moreover, Murphy is directed to achieving a multi-layer component where the platinum aluminum layer is not at the substrate surface as is required of claim 18 and claim 52 and the claims dependent therefrom.

The Office Action offers Sangeeta '780 as teaching diffusion of aluminum subsequent to diffusion of platinum. However, Sangeeta does not make up for the failure of Murphy to teach the substrate surface region having an integrated aluminum content of less than 18 wt % at the component surface as Murphy provides an intermediate layer which is protected by two further layers. Further, Murphy's disclosure of an aluminum content of about 18 to about 26 percent by weight actually teaches away from the claimed aluminum concentration of less than 18 weight percent. Sangeeta '780, like Sangeeta '406, discloses the use of slurries, however Sangeeta '780 does not appear to indicate the amounts of various metals in the slurries.

With respect to claims 25-29, 31-46, 48-51 and 52 – 59, the Office Action indicates that Murphy does not teach the aluminum or platinum content as being essentially constant in a zone comprising a specific percentage of a bounded region. Thus, the Office Action admits that the reference fails to disclose the presently claimed invention. The Office Action indicates that "Murphy forms like materials in a like matter, in would therefore be expected that the diffusion coating will have the same characteristics claimed." The premise on which this conclusion is based, however, is wrong. As explained above, Murphy does not form like materials. Accordingly, Murphy cannot employ the same methods as those contemplated by the present inventors. Because Murphy does not teach that the aluminum or platinum content is essentially constant and because Sangeeta '780 fails to teach that the aluminum or platinum content is essentially constant, the proposed combination of references fails to teach each and every element of the presently claimed invention. Accordingly, these obviousness rejections cannot be properly

maintained and reconsideration and withdrawal thereof are respectfully requested.

The rejection of claims 4-7, 13-15, 19-21, 25-29, 31-46 and 48-59 under 35 U.S.C. § 103(a) over Rose et al. (5,482,578; 5,492,796; and 5,843,588) in view of Murphy (5,716,720) is respectfully traversed.

Claims 4-7 depend from claim 2 and recite, among other things, varying platinum and aluminum metal content. Claim 13-15 depend from claim 11 and also recite varying metal content in the coating. Claims 19-21 vary the metal content recited in claim 18. Claims 25-29, 31-46 and 48-59 recite that at least one of the platinum and aluminum content in a zone of the substrate surface region is essentially constant.

The Office Action admits that Rose does not teach the percentage of platinum in the platinum group metal layer applied to the substrate. The Office Action also admits that Rose does not teach the aluminum content or platinum content as being essentially constant in a particular zone.

As discussed above, Murphy is directed to an arrangement where an intermediate layer with the requisite range of platinum is protected with two further layers. This is completely different from the presently claimed arrangement where the substrate surface region is at the component surface. Thus, if one were to combine the teachings of Murphy with those of Rose, as proposed in the Office Action, one would still not arrive at the presently claimed invention.

With regard to claims 25 – 29, 31 – 46 and 48 – 59 the Office Action concludes that Rose forms like materials in a like manner. This conclusion is again based on a faulty premise. Rose does not teach forming like materials and accordingly one of skill in the art would not expect that Rose teaches the same manner of forming these materials as that contemplated by the present inventors. In actual fact Rose contemplates forming different materials and uses

a different manner than that contemplated by the inventors of the present application.

For the foregoing reasons the Office Action has failed to lay out a *prima facie* showing of obviousness and the obviousness rejection cannot, therefore, be properly maintained. Reconsideration and withdrawal of this rejection are respectfully requested.

The rejection of claims 5-7, 14-15, 20, 21, 25-29, 31-46 and 48-59 under 35 U.S.C. § 103(a) over Rickerby et al. (EP 0 718 419) in view of Rose et al. (5,482,578; 5,492,796; or 5,843,588) further in view of Murphy (5,716,720), is respectfully traversed.

The failure of the proposed combination of any of the Rose patents with Murphy to teach all of the elements of the presently claimed invention is discussed above. Rickerby is also discussed above. In particular, in Rickerby, like the Murphy reference, a multi-layer coating system is provided where the aluminum containing later is underneath two further layers. Such an arrangement is not contemplated by the present claims. Further, the proposed combination of references does not teach that the aluminum content or platinum content is essentially constant in a particular zone.

As a result, the proposed combination of references does not disclose or suggest a platinum-aluminum substrate surface region which is at the component surface, or an arrangement where the aluminum content or platinum content is essentially constant in a particular zone, as is presently claimed. Thus, the proposed combination of references fails to disclose or suggest each and every claim element and reconsideration and withdrawal of the rejection are respectfully requested.

The rejection of claims 1-6, 8-17, 18-29, 31-40, 42-46, 48 and 50-59 under 35 U.S.C. § 103(a) over Sangeeta (6,395,406) in view of Sangeeta et al.

(6,485,780) is respectfully traversed. The Office Action admits that Sangeeta '406 does not teach diffusion of aluminum subsequent to diffusion of platinum and offers Sangeeta '780 as making up for the deficiency of the primary reference.

However, neither of the references teaches the presently claimed metal content limitations in the substrate surface region. Instead, Sangeeta '406 discusses the metal content of the starting materials (slurries) but not that of the resulting coating. Sangeeta '780 does not appear to address the metal content in the coatings at all. The aluminum content of the starting materials cannot be equated with the aluminum content in the substrate surface of the final product. Further, there is no disclosure of aluminum content overlapping that of the present invention. The disclosure of the higher range of 20-60 weight percent actually teaches one of skill in the art away from trying a lower range as contemplated by the claims. Further, the reference does not suggest a zone with an essentially constant metal content.

Accordingly, the proposed combination of references fails to teach each and every element of the claimed invention and the obviousness rejection cannot, therefore, be properly maintained. Reconsideration and withdrawal thereof are respectfully requested.

The rejection of claims 7, 41 and 49 under 35 U.S.C. § 103(a) over Sangeeta (6,395,406) in view of Sangeeta et al. (6,485,780) in view of Rose et al. (5,482,578; 5,492,796; or 5,843,588) and further in view of Murphy (5,716,720), is respectfully traversed.

Claim 7 depends from claim 2, which requires a substrate surface region with an aluminum content less than 18 weight percent at the component surface. Such an arrangement is not disclosed or suggested by any of the cited prior art for the reasons explained above.

Sangeeta '406 relates to the metal content of starting materials but not the end products. Like Sangeeta '406, Sangeeta '780 discloses the use of slurries, however Sangeeta '780 does not appear to indicate the amounts of various metals in the slurries. Similarly, the Rose patents describe the metal content of starting materials but not the end products. Murphy describes a multi-layer structure, and not one where the surface layer of the component has the required characteristics.

Claims 41 relates to components and claim 49 relates to coatings with a zone having an essentially constant content of platinum or aluminum. As explained above, none of the cited references describe such an arrangement. The references, either alone or in the proposed combination, do not teach like components that are formed in a like manner. The references do not suggest that a zone having an essentially constant content might be created. Accordingly, the references fail to teach or suggest each and every claim limitation and reconsideration and withdrawal of this rejection are respectfully requested.

The rejection of claims 1-29, 31-46 and 48-59 under 35 U.S.C. § 103(s) over Schaeffer (6,066,405) is respectfully traversed.

The Office Action admits that Schaeffer states that the coating contains at least 18 percent aluminum and at least 18 percent platinum. Taken as a whole a person of skill in the art would read this to teach away from any substrate surface region having a metal content of less than 18 percent for either of these metals. Stated another way, the reference actually discourages one of skill in the art from even trying to form a substrate surface region having a metal content of less than 18 percent for platinum or aluminum. Thus, the diffusion coating techniques of Schaeffer would never result in the same coating as is presently claimed, as one of skill in the art is discouraged from lowering the platinum and/or aluminum concentration as necessary to arrive at the presently claimed invention.

The Office Action asserts that one of skill in the art would try to optimize the metal content ranges and arrive at the claimed invention. Given the clear teaching away from the presently claimed metal compositions in the Schaeffer reference, one of skill in the art would not be motivated to “optimize” the metal compositions as necessary to meet the limitations of the present claims. While it may be reasonable to assume that one of skill in the art might optimize some variables within a given range; the cases related to optimization do not stand for the proposition that when a range is provided in some reference, persons of skill in the art will try to optimize the given variable outside of that range. This is especially true in the present instance, where the reference very clearly states the lower useful limit of the metal compositions is above that presently claimed.

Despite that the reference does not disclose each and every limitation of the claimed invention, the Office Action asserts that the reference amounts to a *prima facie* showing of obviousness. This simply cannot be the case where the reference does not disclose or suggest each and every limitation of the present claims. The purported obviousness of the claimed invention over the disclosure of the reference is even less true when one considers the references consistent teachings that the metal content is always higher for platinum and aluminum than that presently claimed.

Still further, Schaeffer provides no indication as to how one might form a region having a constant metal content as is required by the claims. Indeed, in this respect, the reference fails to describe the production of like components.

Accordingly, the obviousness rejection cannot be properly maintained. Reconsideration and withdrawal thereof are respectfully requested.

REMARKS

In view of the foregoing, the application is respectfully submitted to be in condition for allowance, and prompt favorable action thereon is earnestly solicited.

If there are any questions regarding this response or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket No. 011235.53144US).

May 4, 2007

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